



HABITAT UTILIZATION BY SMALLMOUTH BASS IN THE LITTORAL ZONE OF LAKE WASHINGTON AND LAKE UNION

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ACKNOWLEDGEMENTS

Funding

- City of Seattle, King County

Divers

- P. Verhey, R. Seizemore, M. Ulrich, A. Bradbury

Other Support

- Keith Kurko, Doug Houck, Mark Carr, Hwa Kim, Mike Mizell, Seattle Police

STUDY OBJECTIVES

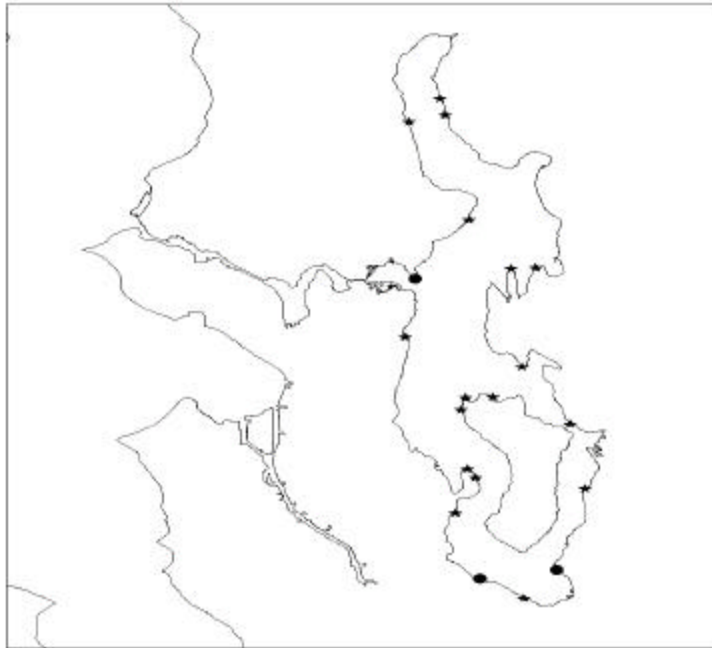
- **Determine utilization of littoral zone habitats by predators in Lake Washington and Lake Union, especially effects of structure and substrate on distribution.**
- **Determine effects of scale on patterns of distribution and abundance.**
- **Determine if shoreline development affects habitat use by predators**
- **Evaluate annual, seasonal, depth, and size related patterns.**

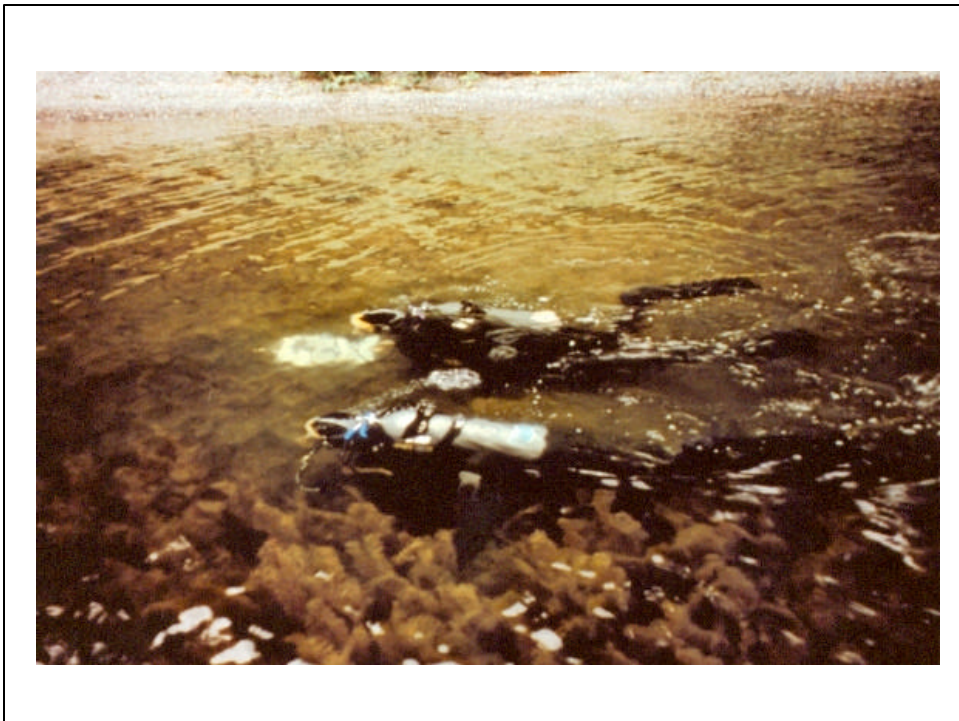
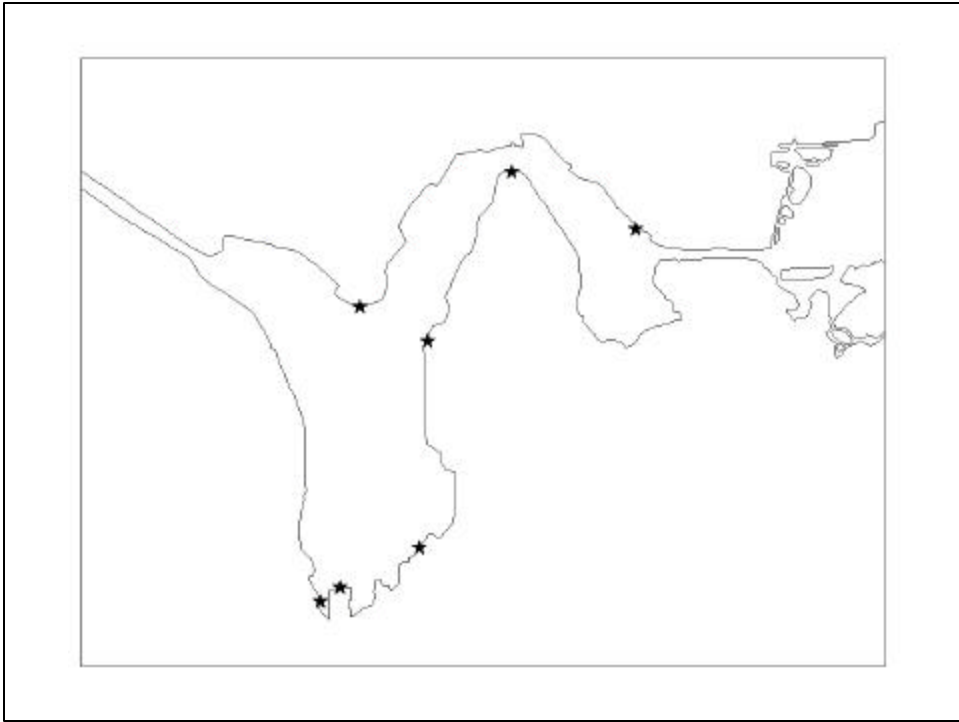
OVERALL OBJECTIVE

DETERMINE IF DEVELOPMENT OF LAKE WASHINGTON AND LAKE UNION SHORELINES HAS INCREASED PREDATION ON JUVENILE SALMON.

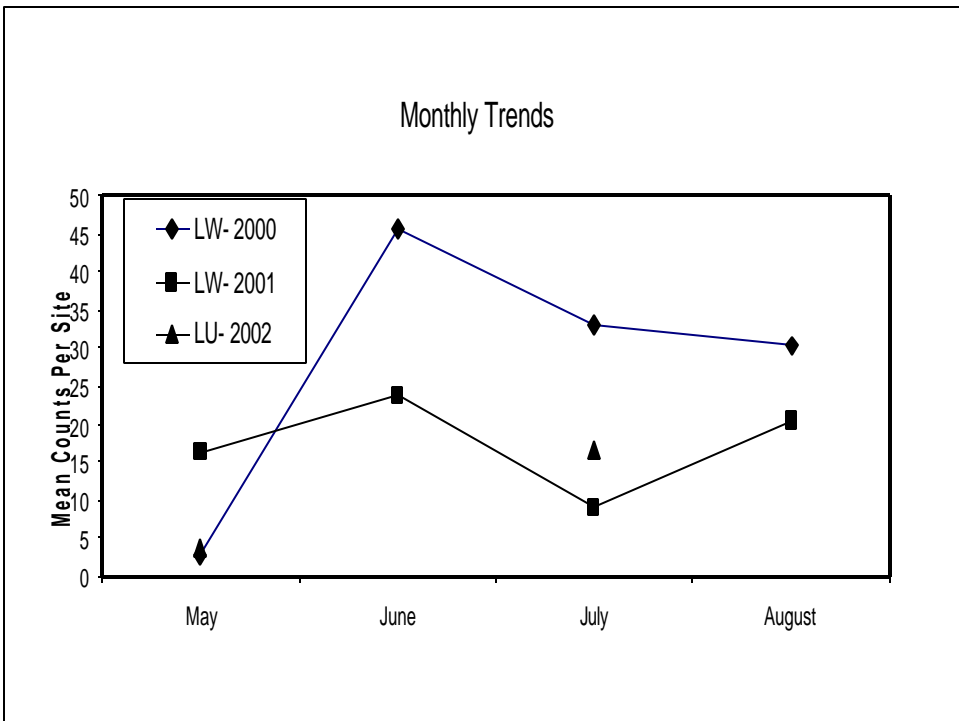
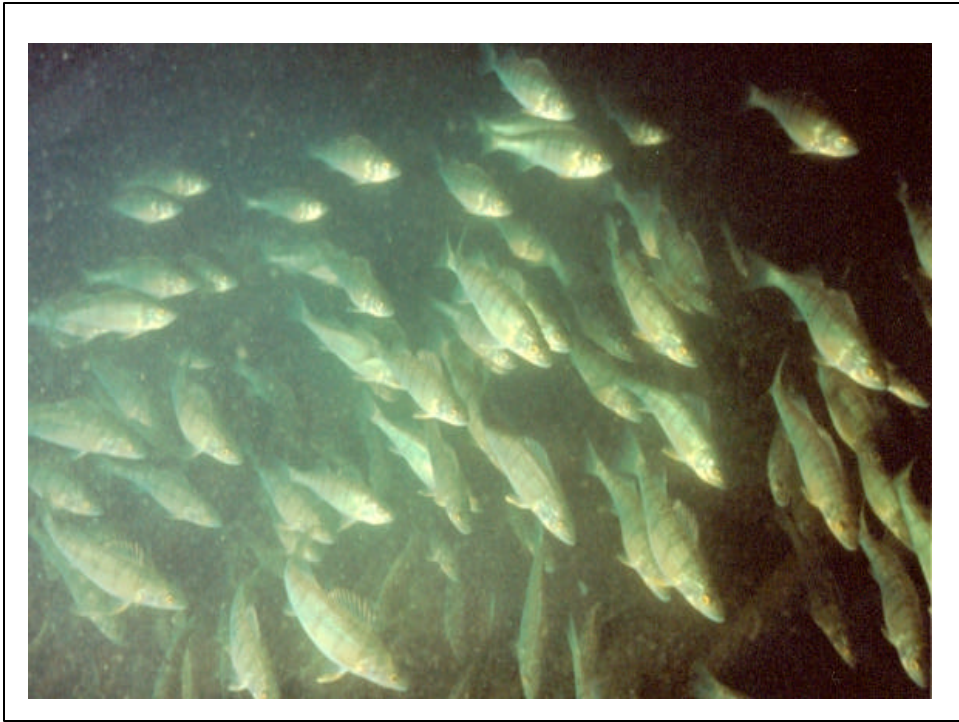
METHODS

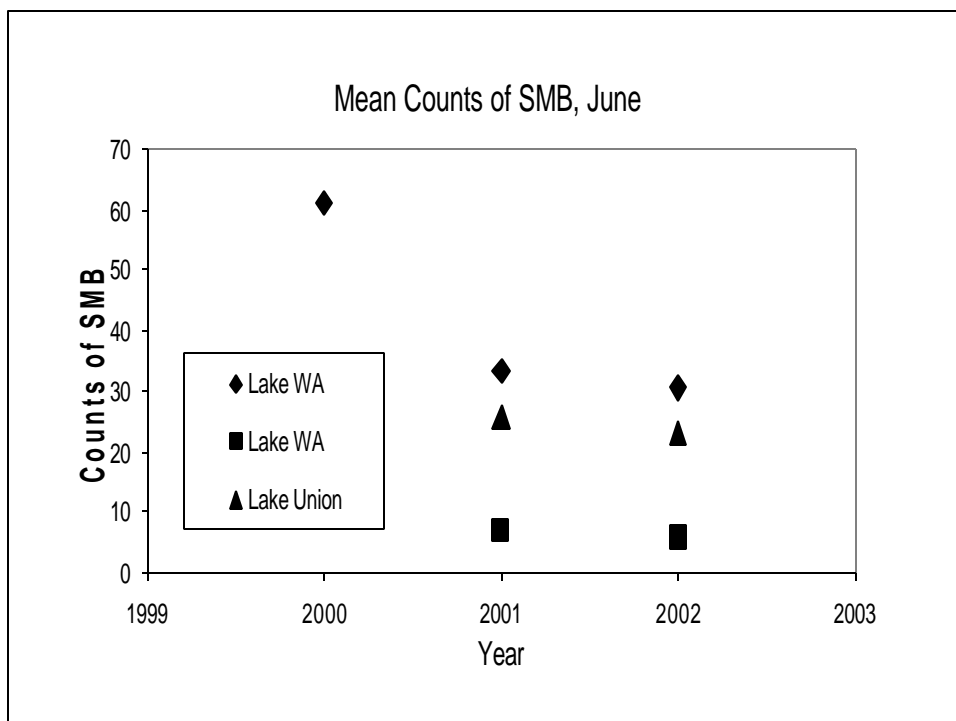
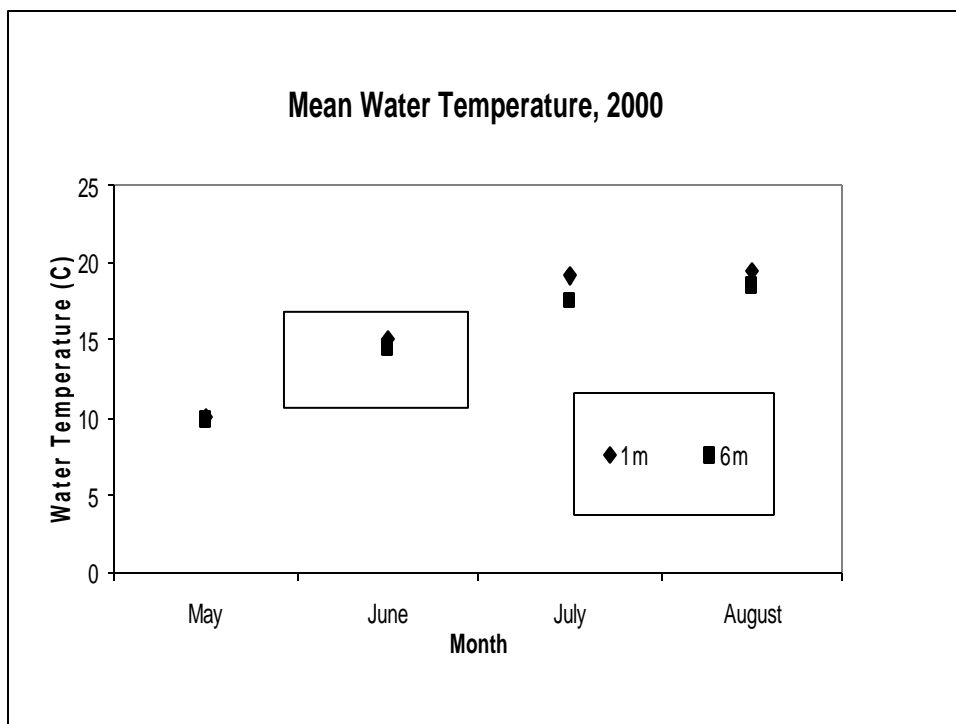
- Study conducted 2000-2002, May-Sept.
- Study sites haphazardly selected throughout Lake Washington and Lake Union.
- Each site was about 333m in length.
- SCUBA divers swam transects at each site and recorded position of predators, size class, and relevant habitat features using sub-meter GPS.
- Three depths surveyed at each site (1m, 4m, 6-7m).
- Habitat features recorded included substrate, structure type and size, dock attributes.
- Data analyses conducted with MAPINFO.
- PRELIMINARY RESULTS PRESENTED= 2.5 YEARS

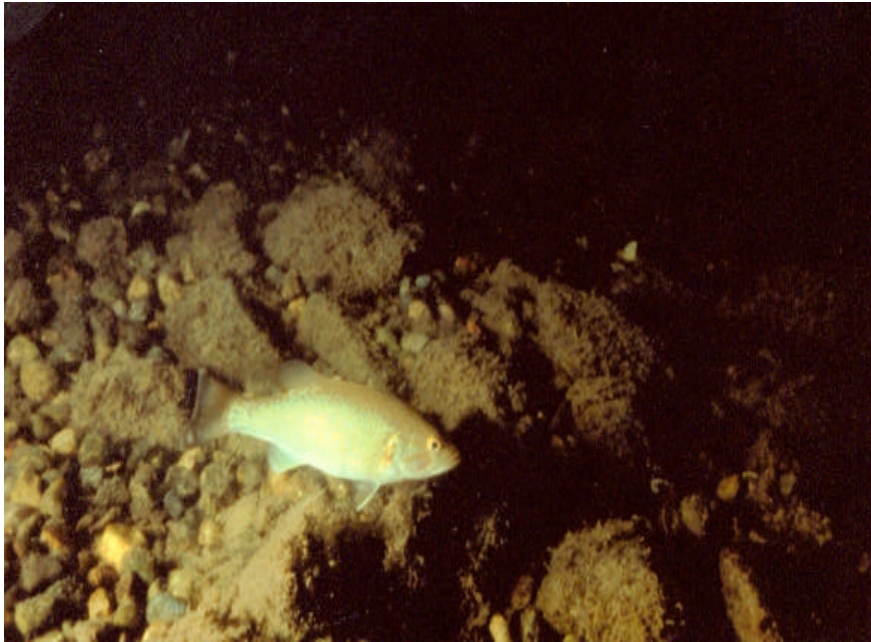




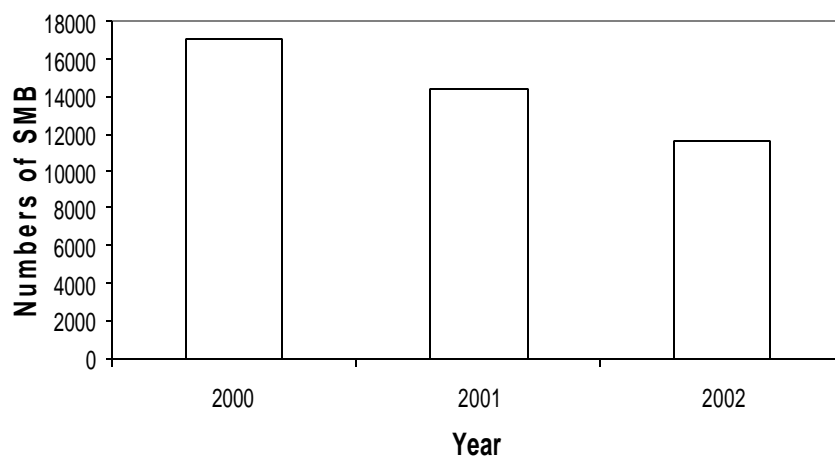


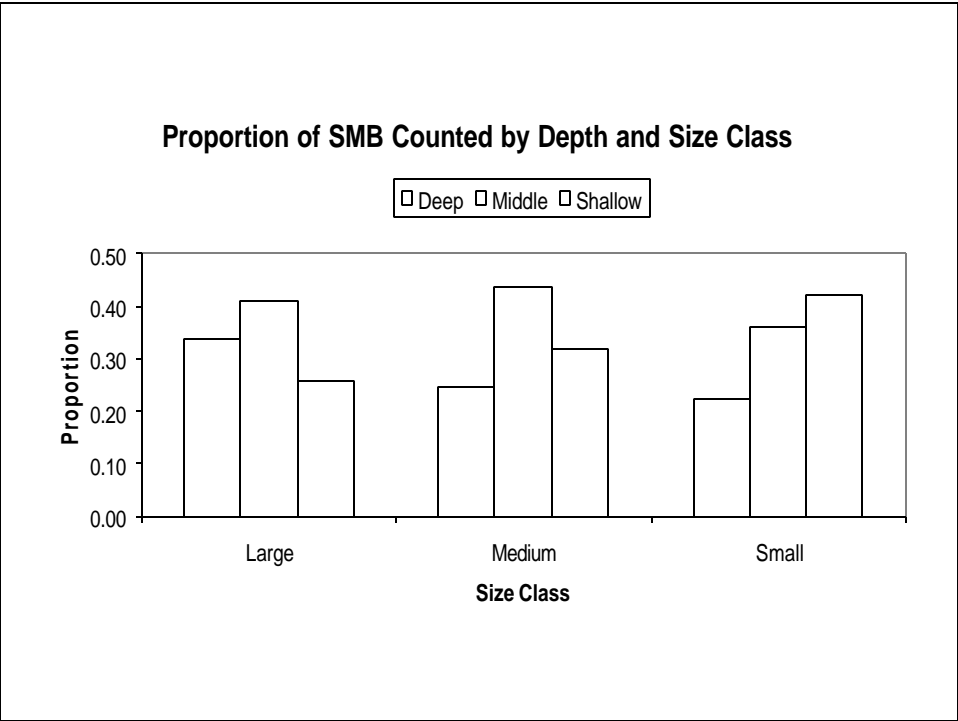






Population Size Estimate in Lake Wa, June





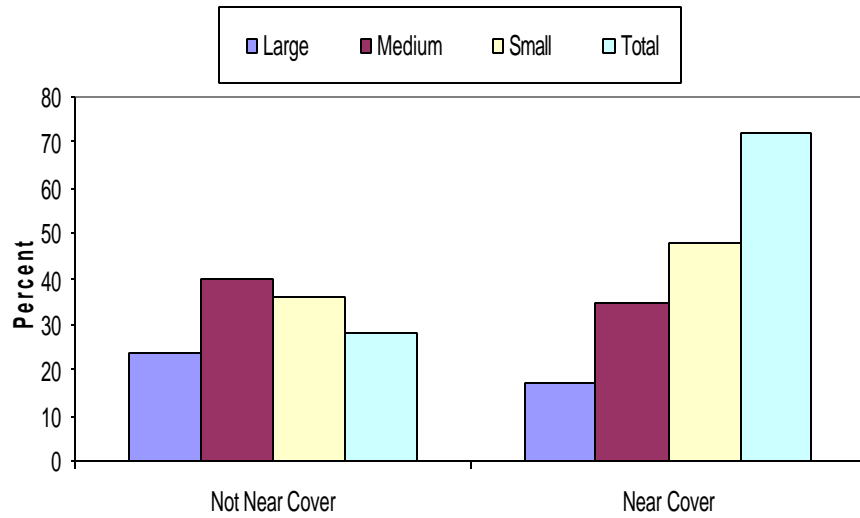
Between Site Variability in SMB Counts

<u>Location</u>	<u>SMB/333m</u>
St.Edwards	0.0
Renegade	0.0
Allisons	7.3
Webster Pt.	17.0
Bear House	17.5
Faben	56.2
Taylor Creek	98.8
Coleman	104.3
Webster Pt.	107.3

Effects of Site Attributes on SMB Abundance (June 2000,2001)

<u>Attribute</u>	<u>R²</u>
No. Docks	< 5%
No. Pilings	< 5%
% Covered Veg.	< 5%
Surf Area of Docks	< 5%
% Mud	30% (-)
% Sand	< 5%
% Mud, Sand	36% (-)
% Cobble, RR	44% (+)
% Natural Shoreline	37% (+)

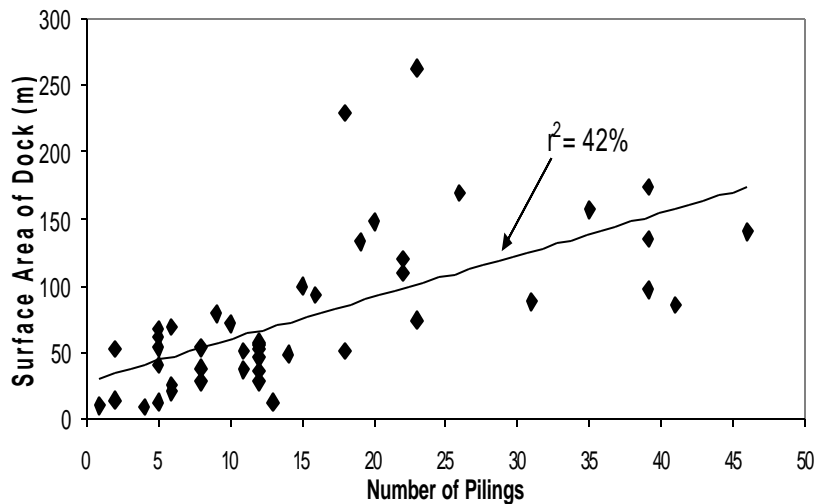
SMB Associated with Cover by Size Class



<u>Site</u>	<u>Prop. SMB with Dock</u>	<u>% Transect that is Dock</u>
Coleman	0.281	0.039
Webster	0.271	0.067
Taylor	0.624	0.101
N. Mercer	0.609	0.123

<u>Attribute</u>	<u>0, 1 SMB</u>	<u>> 1 SMB</u>
# of Docks	26	25
Mean # of Pilings	11.4	20.7
Mean SA of Dock	59m	101m
% Docks Skirted	19%	32%
Mean Height over Water	4.2cm	5.7cm
Mean Depth at End	3.6m	4.4m
Mean Dist. To Nearest Dock	10.6m	13.9m
% Veg, Sparse or None	62%	68%
% Mud, Sand at Deep End	81%	77%

Pilings vs Dock Surface Area



Summary and Preliminary Conclusions

- In Lake Washington, juvenile chinook are most at risk to SMB predation. Risk to other species is lower.
- In Lake Union, all salmon species at risk.
- In Lake Washington, presence of SMB at a site is determined by large scale habitat attributes-amount of cobble and mud.
- In Lake Washington, SMB prefer dock habitat at sites where they are abundant. SMB are most abundant around docks that are large, in deeper water, have large numbers of pilings, are skirted and are higher over the water.

Management Implications: Initial Thoughts

All factors considered, SMB predation in Lake Washington is overall probably not a significant source of mortality of juvenile salmon.

SMB predation in Lake Washington is most significant in several specific areas. Management should focus on dock attributes in these areas.

Key Uncertainties

Lake Union

- Population Size**
- Where do SMB come from**
- Distribution especially near Locks**

